Cal/EPA

California Environmental Protection Agency

Pete Wilson
Governor

Peter M. Rooney
Secretary for Environmental Protection

November 19, 1997

Jon Young, President
Hasstech
6985 Flanders Drive
San Diego, CA 92121

Dear Mr. Young:

EPA 301 Comparison Testing of VacuSmart and VacuCheck with CARB TP201.5 at a Facility with a Tokheim MaxVac System

Thank you for your patience and assistance in conducting the equivalency tests for the Hasstech (A/L) instruments. Based on the results described in the enclosed summary of the report by Hasstech's engineer, we can not fully approve the VacuCheck and VacuSmart procedures as alternatives to CARB TP-201.5, when applied to a Tokheim MaxVac system as described in CARB Executive Order # G-70-154. However, we give limited approval to the VacuSmart procedure for two gallon refuelings.

To briefly summarize the report, comparison testing was performed using two levels of flow restriction in the front end hardware hanging at a facility with a Tokheim MaxVac. VacuSmart passed its USEPA Method 301 comparison tests with TP201.5 for two gallon refuelings, but failed for three and four gallon refuelings. VacuCheck failed for two, three, and four gallon refuelings.

Please contact Cindy Castronovo at (916) 263-1628 if you need further assistance.

Sincerely,

William V. Loscutoff, Chief
Monitoring and Laboratory Division

Enclosure

cc: Jim Morgester, Chief
Compliance Division

Jim Johnson, Chair
CAPCOA Vapor Recovery Committee

EPA 301 Comparison Testing of VacuSmart and VacuCheck with CARB TP201.5 at a Facility with a Tokheim MaxVac System

Introduction:

In 1996, Hasstech requested evaluation of its VacuSmart and VacuCheck instruments as alternatives to the procedures contained in ARB TP-201.5 "Determination (by Volume Meter) of Air to Liquid Volume Ratio of Vapor Recovery Systems of Dispensing Facilities"

Section 13 of TP 201.5 "ALTERNATIVE TEST PROCEDURES" essentially states that such alternatives shall only be used with written approval from the ARB Executive Officer. The applicant is responsible for satisfying the ARB Executive Officer that the alternative certification procedure is equivalent to the subject test procedure.

ARB Testing Section staff agreed to conduct side-by-side tests of TP-201.5 to evaluate the Hasstech instruments using USEPA Method 301 as a basis for equivalency determination.

Test Method:

EPA Method 301 provides four categories of procedures for determining precisions and biases which can be used to decide issues of equivalency between validated and alternative test procedures. The four general categories are:

(1) Isotopic Spiking

(2) Comparison Against a Validated Test Method

(3) Analyte Spiking

(4) Probe Placement and Arrangement for Stationary Source Stack or Duct Sampling

Only the second category applies here. Each test requires comparison runs of the validated test method and the alternative test method. Nine paired runs are required for each vapor recovery system mode.

Comparison testing was performed in two system modes using two levels of restriction to flow in the front end hardware hanging at a facility with a Tokheim MaxVac. This was achieved by, for instance, hanging a long narrow hose to get high restriction or a short wide hose to get low restriction.

Finally, each test mode was run for three different times; for the time it took to dispense two, three, and four gallons.

Per the rules of EPA 301, the test runs were organized into pairs of runs. Because TP-201-5 was run each time with one or more comparison runs, at least one data pair was extracted per run of TP-201-5.

Per the rules of EPA 301, the test pairs were subjected to precision and bias testing at the ninety-fifth percent confidence level with the following criteria:

(1) Precision:

(a) If the F statistic is less than or equal to 3.44, then the precisions are adequately equal.

(b) If the F statistic is greater than 3.44, then the candidate procedure fails.

(2) Bias:

(a) If the t statistic is less than or equal to 1.397, then no Correction Factor is needed.

(b) The Correction Factor is the (Validated Value) / (Candidate Value).

(c) If a Correction Factor is at or inside the range 0.9 to 1.1, the candidate procedure passes.

(d) If a Correction Factor is outside the range 0.9 to 1.1, the candidate procedure fails.

Test Results

VacuSmart passed its comparison tests with TP201.5 for both levels of restriction and at one refueling volume (2 gallons) per EPA 301 on a Tokheim MaxVac. VacuSmart failed at two refueling volumes (3 and 4 gallons). VacuCheck failed at all three refueling volumes.

F = F statistic
t = t statistic
CF = Correction Factor
VS = VacuSmart
VC = VacuCheck

Low Restriction

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
F	0.47	2.11	6.20	9.39	12.66	9.88
t	9.066	5.842	3.827	1.450	1.029	0.994
CF	0.952	0.960	0.960	0.980	1.000	1.000
	pass	pass	fail	fail	fail	fail

High Restriction

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
F	2.61	8.37	8.37	11.11	20.39	14.82
t	8.230	4.330	3.464	2.345	1.237	0.691
CF	0.941	0.949	0.959	0.969	1.000	1.000
	pass	fail	fail	fail	fail	fail

EPA Correction Factor Averages

	VS 2 gallon	VS 3 gallon	VS 4 gallon	VC 2 gallon	VC 3 gallon	VC 4 gallon
CF	0.947	N/A	N/A	N/A	N/A	N/A
	pass	fail	fail	fail	fail	fail